SOFTWARE CONFIGURATION MANAGEMENT (SCM) PLAN

for the

ECONOMIC CURRENT SURVEYS

Hummingbird #583

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Document Change History

Software Configuration Management (SCM) Plan for the Economic Current Surveys

Version	Date	Name	Description of Change

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for the
ECONOMIC CURRENT SURVEYS

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1. INTRODUCTION

1.1 Overview

Software Configuration Management (SCM) is a process that is used to establish and maintain the integrity of the deliverable products (e.g., requirements documents, design documents, source code, input and output files, and executable code) created throughout a project's software life cycle[1]. SCM ensures consistency of a product's performance, and functional and physical attributes, with its requirements, design, and operational information.

The following key activities are associated with SCM:

- Identifying the roles and responsibilities of people involved in the configuration management for the project
- Identifying configuration items for the project
- Establishing libraries in which to store configuration item documents and code
- Developing a change control process for requesting, approving, and implementing changes to the configuration items
- Developing a communication strategy to notify users and interested parties of changes to the configuration items
- Developing a process for implementing and tracking approved changes

1.2 Scope

All Current Survey software projects in the Economic Directorate must use the Software Configuration Management plan outlined in this document. This includes all software being developed for the Standard Economic Processing System (StEPS), as well as software being developed for legacy systems used to process surveys that are not in StEPS.

Although this plan applies to all current surveys, details specific to each project will be defined separately in the "Current Surveys SCM Details List" (Appendix A). The "SCM Details List"

[1] "The U.S. Census Bureau's Configuration Management Process Description", Version 1.0, March 29, 2004.

serves to simplify the SCM process by allowing project teams to fill out a generic form rather than develop their own SCM plan. The SCM Details list should be included as an attachment to the Software Development Plan for your project.

2. CONFIGURATION ITEMS

Configuration items are work products (e.g., documentation, software, hardware) that have been designated for configuration management. They are items, that once agreed upon, can only be changed through a formal change control process. Configuration items are often based on the project deliverables identified in the project Software Development Plan[2]. They are identified by the software configuration manager (if one has been appointed by the team), the project manager or the team itself. Examples of configuration items include software development plans, user requirements, software/design documents, test plans, source code, and input and output files. Items specified as configuration items must be defined, managed and controlled.

All Current Survey software projects in the Economic Directorate must include, at a minimum, the configuration items listed below. Specifics for each item must be defined in the "SCM Details List" (Appendix A). This list may be expanded to include additional items, as appropriate.

• Production code	The complete set, or any of the individual items of the set, of computer programs, code, data structures and data, delivered to, or already in use by the end user or customer
• Computing Environment	The hardware and software used for a project (details of the computing environment must be documented)
• Requirements Document	A document that defines *what* the system will do
• Design Document	A document which defines *how* the software will meet the requirements specified by the customer in the requirements document
• Software Development Plan	A collection of plans that describe the activities to be performed for the software project; it governs management of the activities by the software group
• Current Survey's Milestones Schedule	Schedule of Current Survey projects in the Economic Directorate; updated and maintained by EPCD; Hummingbird # 302.
• Others	Define other configuration items as appropriate

[2] See the "The Census Bureau's Software Project Management Process", SEPG, July 2003 for more information on software development plans (http://cww2.census.gov/it/ssd/cspi/pal.asp).

3. LIBRARY OF BASELINED PRODUCTS

All products that are identified as configuration items (Section 2) must be baselined. The term "baseline" is used to describe a specification or product that has been formally reviewed and agreed upon, and serves as the basis for further development. Any changes to a specification or product after it has been baselined, can only be modified through a formal change control process (See Section 5).

The procedures for baselining configuration items may vary among projects. The "Requirements Development and Management (RDM) Guidelines", Hummingbird Document # 1104, should be followed when baselining *user requirements*. All code, once moved to production is considered baselined. Procedures for baselining other configuration items (e.g., software development plan, design documents) should be specified in the "SCM Details List" (Appendix A).

Baselined products must be stored in a location that is accessible to all configuration management participants. Each project is required to set up a configuration management library system. Software tools may be used to support the project's library system and archives should be set up for storing and retrieving baselined versions of each configuration item. When setting up libraries, give special consideration to how the archives are organized. For example, folders may be set up by project component, development phase, configuration item type, or cycle period.[3] When documenting the library system used by your project, consider the following

- Directory structures
- File naming conventions
- Creating directories/files
- Archiving directories/files
- Deleting directories/files

For legacy systems and software developed outside of StEPS, identify (in the "SCM Details List") where the *production code* resides and what type of code management system is in use. Include information about the different versions of code, where they are stored, how they are updated, etc. For StEPS-related projects, refer to the "StEPS Change Control Process" document (Hummingbird #1655).

Configuration items (e.g., requirements, schedules, computing environment), other than production code, must:

- Be documented and stored in Hummingbird in the "Current Surveys" library
- Have a unique Hummingbird document #
- Have a "Record of Change" log, which identifies changes to the document after the document has been baselined
- Marked "Initial" (in the Hummingbird profile) while in development, prior to approval or baseline
- Marked "Working" (in the Hummingbird profile), once approved/baselined

[3] "U.S. Census Bureau's Configuration Management Process Description", Version 1.0, July 2004

- Marked “Final” (in the Hummingbird profile), once released

4. SCM ROLES AND RESPONSIBILITIES

The roles and responsibilities of the various people involved in the SCM process must be defined and documented for each project. At a minimum, each project must have the following:

SCM Roles and Responsibilities		
	Key Person(s)	**Role/Responsibility**
1	Change Control Board (CCB) *Identify who makes up the CCB in the SCM Details List (Appendix A)*	• Approve/deny/defer change requests • Identify need for an impact analysis • Determine need for charter • Prioritize approved change requests for implementation • Refer change requests to CCB2
2	2nd Level Change Control Board (CCB2) *Identify who makes up the CCB2 in the SCM Details List (Appendix A)*	Approve/deny change requests if CCB cannot reach consensus, if change affects the Current Survey’s Milestones schedule, or if change requires a charter
3	Change Control Coordinator (CCC) *List the name of the CCC in the SCM Details List (Appendix A)*	• Receives all change requests • Assigns change request # • Places change requests in Hummingbird • Performs initial assessment • Coordinates preparation of materials for CCB and, when applicable, the CCB2 • Maintains/updates change request document • Tracks all change requests from receipt through completion
4	Requesters *Specify who can submit change requests in the SCM Details List (Appendix A)*	• Submit change requests to the CCC

Identify, in the “SCM Details List” (Appendix A), the names of the persons filling these roles. If additional roles and/or responsibilities are required, these should also be noted. SCM roles and responsibilities are documented for StEPS-related projects in the “StEPS Change Control Process” (Hummingbird #1655). The roles indicated above are further explained in Section 5, “Change Control Process”.

5. CHANGE CONTROL PROCESS

A Change Control process is needed to assist managers, system developers, and end users in managing changes to system software. The change control process helps to ensure that:

- System integrity is maintained
- Only authorized changes are made
- Software changes are tested thoroughly
- Correct versions of software releases are maintained
- All individuals affected by software changes are notified

A change control process describes how changes are initiated, recorded, reviewed, tracked and closed. It provides guidelines and procedures for requesting, evaluating, and prioritizing changes; and for determining whether to approve, reject, or defer a proposed change.

Each current survey software project should use the change control process outlined below. Detail any changes to this process in the "SCM Details List" (Appendix A). For StEPS-related projects, refer to the document, "StEPS Change Control Process" (Hummingbird #1655) for details on requesting, approving, and managing changes to the StEPS software.

The Change Control Process consists of the following 6 elements:

1.	Change Request	Means by which users may request additional system requirements, enhancements or fixes
2.	Change Assessment	Process to evaluate and assess the impact (e.g., resources, cost, affect to end users) of a requested change
3.	Change Approval	Process by which a change request is approved and scheduled for implementation
4.	Software Development	The design and/or coding of the software needed to implement the requested change (may include gathering user requirements, system requirements, and/or developing software specifications)
5.	Software Testing	Process by which the software change is validated to ensure that the code produces the desired results and does not adversely affect other parts of the system
6.	Software Release	Process by which the newly developed code is copied to production and the change communicated to system users

The general flow for the process is illustrated in Figure 1, below.

CURRENT SURVEYS
CHANGE CONTROL PROCESS

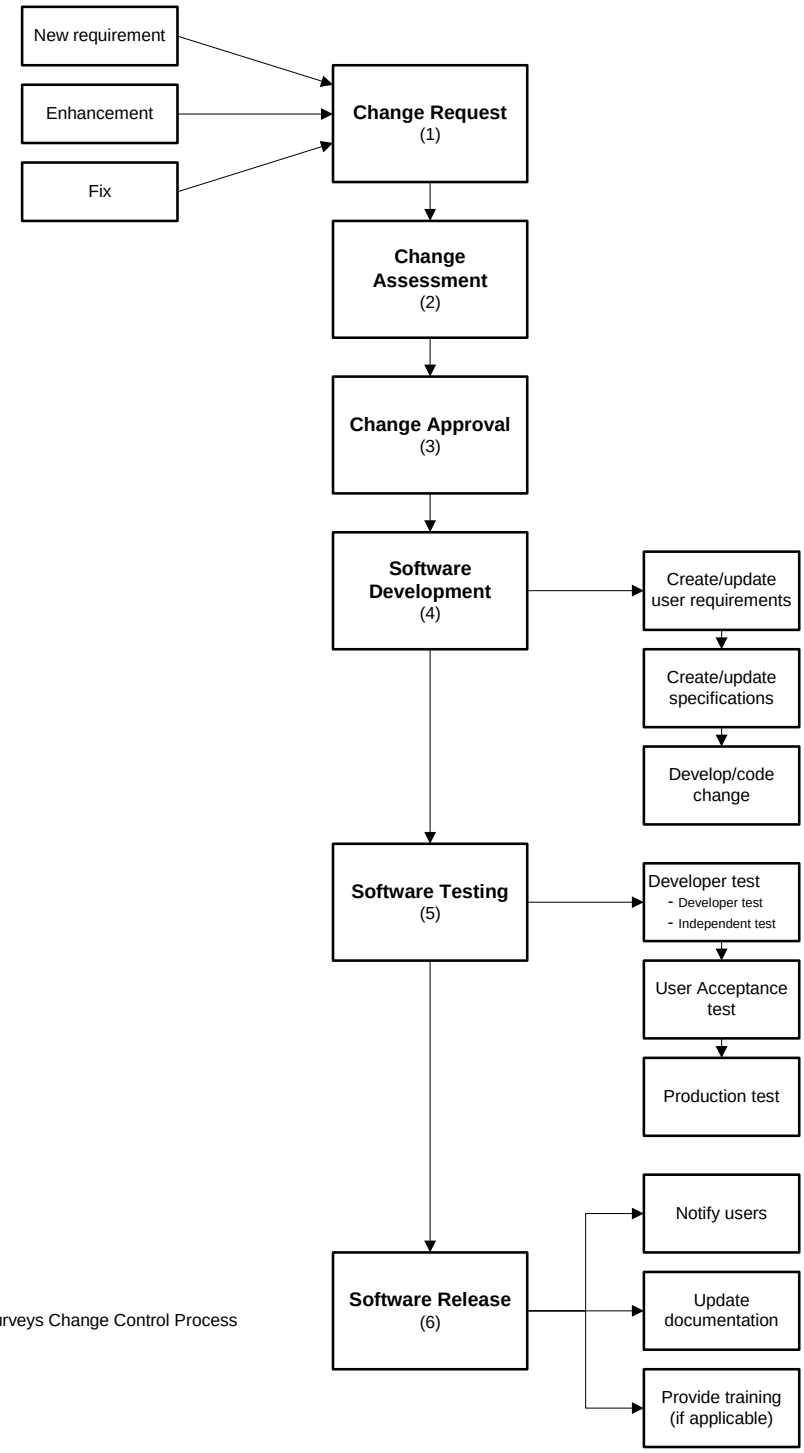

Figure 1: Current Surveys Change Control Process

The six elements

(i.e., change request, change assessment, change approval, software development, software testing, software release) that make up the Change Control process are described in Sections 5.1-5.6. The first 3 elements of the Change Control Process deal with the change request: initiating the request, assessing the impact of the proposed change, and approving the change. The remaining three elements of the Change Control Process deal with the development and implementation of the change: software development, testing, and release.

The following flowchart (Figure 2) illustrates the phases of the Change Control process that deal with the receipt, analysis, and approval of the change request:

Current Surveys
Change Request Flow

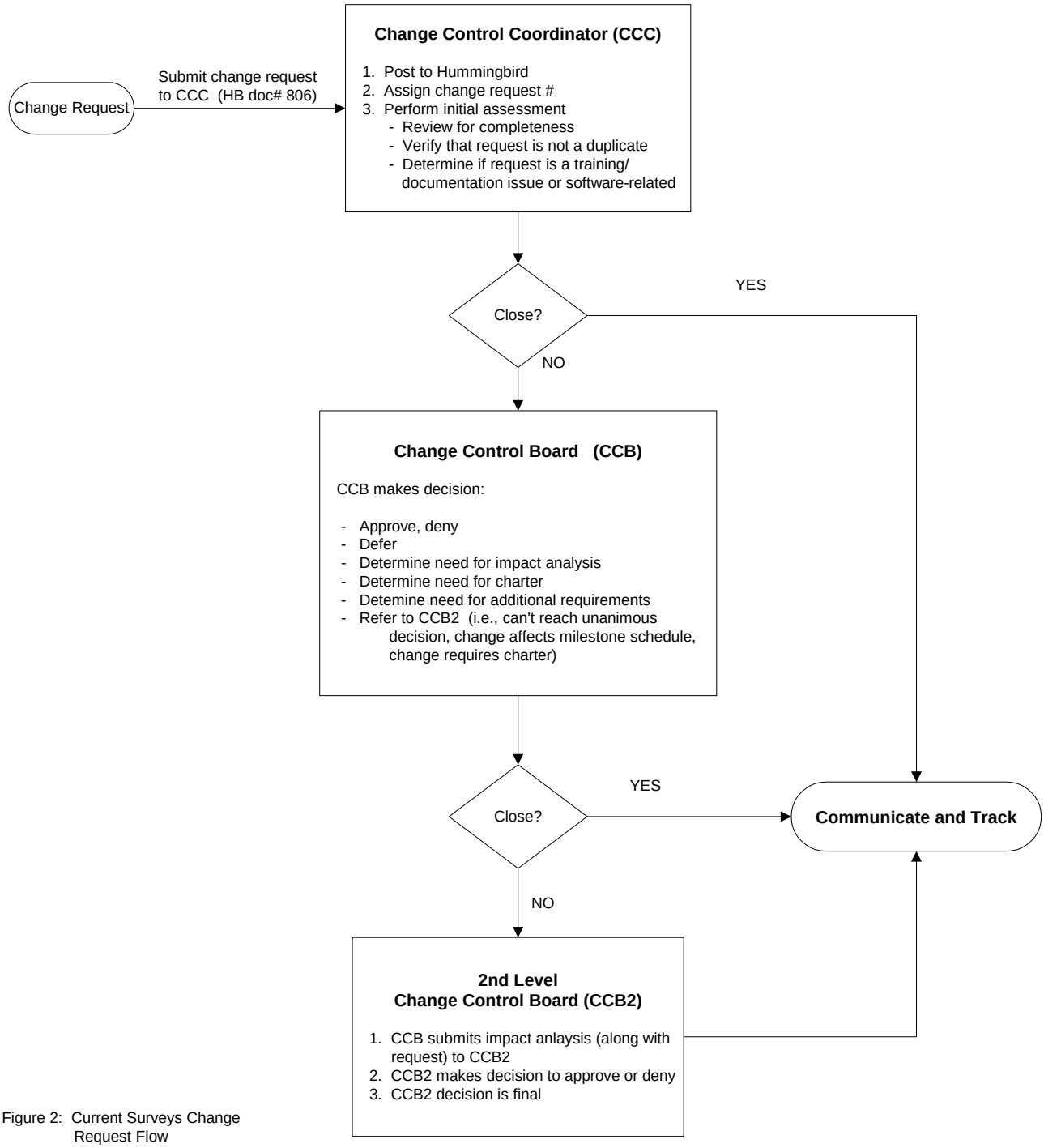

Figure 2: Current Surveys Change Request Flow

5.1 CHANGE REQUEST

Any change to the system must be submitted formally via a Change Request form (See Appendix B, "Current Surveys Change Request Form"). There are 3 types of change requests:

- New requirement — Needed functionality that is not currently available in the system
- Enhancement — Modification to existing system functionality to make the system more efficient and/or user-friendly
- Error — Change to existing code that does not perform per specification or a change to existing documentation that is in error

Note: If a chartered project (e.g., QFR migration, BSR06, SMASM) has its own CCB, but the code being developed or changed affects the StEPS, then a change request form must also be submitted to the StEPS CCB.

5.1.1 Submitting a Change Request

To initiate a change to the system, complete a "Current Surveys Change Request Form" (Hummingbird, document #806) and submit it to the Change Control Coordinator (CCC). Each project will determine who is permitted to submit change requests.

To submit a change request:

5.1.1.1 Download the Change Request form from Hummingbird (document #806).

5.1.1.2 Complete the form. (See section 5.1.2 for detailed information on completing the Change Request Form)

5.1.1.3 Submit the completed form (via e-mail) to the CCC.

5.1.1.4 The CCC will:

- Assign a change control number to the change request
- Post the change request to Hummingbird

Note: The <u>original</u> request submitted to the CCC will be saved as Version 1, in Hummingbird. This version will reflect what the requestor originally submitted to the CCC. Any changes to the original request form (i.e., work logs, approvals, impact analysis, notes, etc.) will be stored as a separate version (Version 2) of the document. Both versions will have the same Hummingbird #.

5.1.2 Completing the Change Request Form

When completing the Change Request form, the following fields are required:

5.1.2.1 Requestor Information

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
1	Name	Name of the requestor
2	Date Submitted	Date that the request is submitted
3	Date Change Needed	Proposed date that the requested change is needed in the system
4	Phone	Requestor's telephone number
5	Division/Branch	Division and branch of the requestor
6	Bldg/room #	Building and room number where the requestor is located

5.1.2.2 Change Information

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
1	Short title of change request	A short description or title of the change requested
2	Project Name	Name of the project associated with the change (if applicable)
3	Charter document #	The document number of the charter associated with the change request (if applicable)
4	Type of change: • Documentation • Processing System • Both	 A change related to the documentation only A change related to the processing system only A change related to both the documentation and the processing system
5	Reason for change: • New requirement • Enhancement • Error	 Needed functionality that is not currently available in the system Modification to existing system functionality to make the system more efficient and/or user-friendly Change to existing code that does not perform per specification or a change to existing documentation that is in error

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
6	Priority[4]	Level of priority for the requested change, which will affect its evaluation and the speed at which it moves through the process.
	• Emergency/Critical	An important system function is not working properly and must be addressed immediately because it is affecting survey production or the mail-out schedule
	• High	Something needs to be fixed or added as soon as possible before survey production is affected
	• Medium	Survey production would run smoother and more efficiently with a specific enhancement or additional feature, but can wait a short period if necessary
	• Low	Requestor would like to see an enhancement or additional feature, but it is not critical to production and can be worked around in the meantime
7	Scope:[5]	
	• Module(s) affected	Module(s) affected by the proposed change (e.g., imputation, estimation, review and correction)
	• Survey(s) affected	Survey(s) affected by the proposed change (e.g. ACES, QSS, SAS, RREX, CIR, ALL)
	• Working draft/Final documents affected	Documents affected by the proposed change (e.g. user manual, user requirements, specifications, design documents)
	• Software work products affected	Software products affected by the change (e.g., programs, data structures)

[4] The priority level of a request may be changed by the CCC or the CCB after entering the Change Control process, based on the assessment of the change. For example, it may be determined during the initial or subsequent assessment, that a change submitted as a 'high' priority should be downgraded to a 'medium' priority because the change is not affecting production. In such cases, the requestor will be notified.

[5] Individuals submitting a change request may not know the scope of the change. The CCC will review this section of the Change Request form during the initial assessment and will modify as needed.

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
8	Change description (include justification)	Detailed description of the change requested; include the justification for and expected benefit(s) from the proposed change

5.1.2.3 Other Change Control Form Fields

The following sections of the Change Control Form are to be completed/updated by the CCC after 1) the initial assessment has been performed, 2) an impact analysis has been completed, 3) the CCB has approved, denied, or referred the change to the CCB2, and/or 4) the change has been approved or denied by the CCB2. (See Sections 5.2 and 5.3 for more information on the Change Assessment and Change Approval processes.)

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
1	Initial Review	
	• Date Reviewed	Date change request was addressed
	• CCB Decision	CCB decision to approve, deny, defer or refer the request to CCB2
	• Comments	Results of the initial assessment or other relevant information regarding the change request; include date each comment was entered
2	Detailed Analysis	
	• Date Reviewed	Date change request was addressed by the CCB2
	• 2nd CCB Decision	CCB2 decision to approve or deny the request
	• Comments	Results of the impact analysis or other relevant information regarding the change request; include date each comment was entered

CHANGE CONTROL FORM FIELDS		
	Field	**Description**
3	Resolution	
	• Date Resolved	Date that the change request was resolved (i.e., approved, denied)
	• Resolution	Detailed information on how the change request was or will be resolved
	• Assignments	List of tasks to be completed in order to implement the change request; include who is responsible for completing the task, the planned completion date, and the actual completion date
4	Status	
	• Open	The change request has been received and is still in the review, approval, or implementation process
	• Closed	A change request has been reviewed and resolved; a request cannot be closed until all assigned tasks, including documentation, have been completed.

5.2 CHANGE ASSESSMENT

Once a change has been submitted to the Change Control Coordinator (CCC), the CCC will perform an *initial assessment* of the request. If the CCC determines that the request is for a change to the software, the change request will be submitted to the Change Control Board (CCB) for approval.

> *Note: If the CCC determines that a change to the software is not needed (e.g., functionality is already provided in the system but the user didn't know it), the CCC may resolve the request without submitting it to the CCB. The CCC, after contacting the requestor and performing any resolution items (e.g., update user manual, update training materials) can close the request. In such cases, the CCC must still inform the CCB of the request and its resolution.*

Before approving or denying a change request, the CCB may determine that an *impact analysis* is needed to identify the effects (e.g., resources needed, surveys affected, modules affected) of implementing the change. Persons assigned to perform the impact analysis may vary by project and should be identified in the "SCM Details List" (Appendix A).

Results from both the *initial assessment* and the *impact analysis* are recorded on the Change Request form. Results of the initial assessment should be noted in the "Initial Review" section of

the form and results of the impact analysis should be noted in the section, "Detailed Analysis". Details on the initial assessment and impact analysis are provided below.

5.2.1 Initial Assessment

The initial assessment of the change request is performed by the CCC. In the preliminary review of the request, the CCC will:

5.2.1.1 Verify that all required fields on the change request form have been properly filled out. If any information has been omitted, the CCC will contact the requestor for the additional information needed and complete the request.

5.2.1.2 Verify that the change request does not already exist under a different change control number.

Note: If the change request is a duplicate, the CCC can close the request and reference the duplicate request # in the "Initial Review" section of the Change Request form.

5.2.1.3 Determine whether the change request is procedural or training-related, or if a change to the software is needed.

- Complete the "Resolution" section of the Change Request form, if the initial assessment indicates that the request is procedural or training-related. (Note: This does not mean that the request is automatically "closed"; change requests cannot be closed until all items associated with the request, including training and documentation, are complete.)

- Refer the change request to the CCB if the initial assessment indicates that the request is software related.

5.2.1.4 Complete the "Initial Review" section of the Change Request form, indicating the results of the initial assessment; include the names of those consulted and the date that the assessment took place.

5.2.2 Impact Analysis

Upon completion of the initial assessment by the CCC, the change request will be forwarded to the CCB. The CCB will determine whether an impact analysis is needed in order to make a decision to approve or deny the request.

If an impact analysis is necessary, the CCB (or persons designated by the project) will work with staff affected by the change, to determine its impact on the project. A "Change Request Assessment Form" is provided in Appendix C, to assist individuals responsible for gathering the information needed to perform the impact analysis.

In conducting an impact analysis, the following should be considered:

- Expected benefits of the change
- Components of the system affected by the change (i.e., performance, other modules, other users)
- Resources needed to implement the change:
  - Gather requirements
  - Create/update specifications
  - Design and code
  - Test
  - Update user documentation (e.g., user manual, help screens)
  - Provide training
- Length of time to implement the change (i.e., estimated completion date) and/or date change is needed
- Alternatives

5.3 CHANGE APPROVAL

The Change Control Board (CCB) is responsible for approving or denying changes. If the CCB cannot reach a decision to approve or deny a request, if the change affects the Current Surveys Milestone Schedule (Hummingbird # 302), or if the change requires a charter, the change request will be referred to the 2nd level Change Control Board (CCB2). The decision to approve or deny a request by the CCB2 is final.

5.3.1 Change Control Board (CCB)[6]

The Change Control Board may be an individual or group. This person (or group) is responsible for:

- Approving a request
- Denying a request
- Deferring a request
- Identifying specific issues/concerns regarding the request

5.3.1.1 Approving a change:

[6] For information on the roles and responsibilities of the StEPS CCB, see the "Change Control Board Charter for the Standard Economic Processing System", Hummingbird #1232.

- CCB members (if more than one person make up the CCB) must reach a unanimous decision in order for a change to be approved.

- If a change is approved:

  - The CCB will determine the priority (in relation to other approved change requests) for implementing the change. It is possible for a previously approved change to have its priority adjusted, based on the importance and/or need for the newly approved request.

  - The CCC will update the Change Request form, indicating the CCB decision to approve, the resolution, and the configuration items[7] required for implementation.

  - The CCB will communicate the change request decision to appropriate persons and the change will be scheduled for implementation[8].

5.3.1.2 Denying a change:

- CCB members (if more than one person make up the CCB) must reach a unanimous decision in order to deny a change request.

- If a change is denied:

  - The CCC will update the Change Request form, indicating the CCB decision to deny and why the request was denied.

  - The CCB will communicate the change request decision to appropriate persons.

5.3.1.3 Referring change requests to the CCB2:

Change requests will be referred to the 2nd level Change Control Board (CCB2) if:

- The CCB cannot reach a decision to approve or deny the change. (If a *group* makes up the CCB, then the decision to approve or deny must be unanimous.)

- Implementation of the change request will affect the Current Surveys Milestones Schedule.

- The change requires a charter.

[7] See Section 2 for more information on "configuration items".

[8] Each project will determine "who" will be responsible for scheduling the change for implementation. This could be part of the CCC's role or some other designated individual. The person or group responsible should be noted in the "SCM Details List" (Appendix A).

5.3.1.4 Deferring a change:

The CCB may defer a decision to approve or deny a request. Changes that are dependent on factors outside of the system may result in the postponement of a decision until the outcome of that other factor is known (e.g., A change is submitted requesting that users be able to log into 2 different surveys from the same machine. At the time the request is submitted, the use of dual monitors is being investigated. In this situation, a decision may not be made to approve or deny the request until the outcome of the dual monitor investigation is known.)

Anytime the CCB elects to "defer" a change, they must indicate on the Change Request form (1) the reason the change is being deferred, and (2) the date that the request will be re-visited. All deferred changes must be reviewed again, within 6 months of being given a "deferred" status.

The CCB decision to approve, deny, or defer a change request, or to refer the request to the CCB2, is final.

5.3.2 2nd Level Change Control Board (CCB2)

Change requests will be submitted to the CCB2 by the CCB, when the CCB:

- Cannot reach a unanimous decision to approve or deny the request
- The implementation of the change request affects the Current Surveys Milestones Schedule[9]
- The change will take longer than 6 calendar months[10] to implement and requires a charter

An impact analysis (see Section 5.2.2) should be completed by the CCB or appointed individual prior to submitting the request to the CCB2. The decision of the CCB2 to approve or deny the request is final.

[9] If a change affects the "Current Surveys Milestones Schedule", it must be presented (by the CCB2) to the Current Surveys Planning Group (CSPG) for approval.

[10] "Six months" includes all work (i.e., requirements gathering, coding, and testing) needed to implement the change.

5.4 SOFTWARE DEVELOPMENT

When a change request has been approved and prioritized by the CCB, it will be referred to the appropriate division or branch for implementation. Requirements for software development include the following:

5.4.1 The subject matter area or processing area will write/update the user requirements and/or software specifications for the change.

5.4.2 The program manager will assign the design and/or code change (for each task associated with the change request) to a programmer. (Note: A single change request could generate multiple programs/tasks.)

Each task must be tracked using a software tracking system. This system may be electronic or manual. The purpose of the tracking system is to monitor the code change from approval through release. Each program change entry should reference the change request number.

5.4.3 If existing code is being updated, the programmer must retain a copy of the current version by saving it to a designated directory.

5.4.4 The programmer will design and/or code the change. All changes to code must be documented in the program itself. At a minimum, the programmer must include a comment at the top of the program indicating why the code was developed or changed, the programmer's name, and the date that the code was created or updated. If a program is updated, the programmer must also include (as a comment) his initials and date on each line of the program in which code was changed. This will ensure that a programmer can determine at any point in time, why a program was changed, who changed it, and the date that it was changed.

5.4.5 The programmer must make every effort to complete the code change, (allowing time for testing), by the implementation date specified in the Implementation Plan. If problems arise or the implementation date cannot be met, the programmer is responsible for notifying the CCC and/or the CCB.

The CCC must communicate any delay in implementation to the users.

5.4.6 The programmer that codes the change must test the change prior to releasing the code to an independent tester. (For more information on testing, see Section 5.5 below.)

5.5 SOFTWARE TESTING

After the software change has been coded, it must be tested to ensure that it performs as specified, and that it does not adversely affect other components of the system.

There are 3 types of testing that must be performed:

- Development test
- User acceptance test
- Production test

The general flow of the testing process is outlined in Figure 3, “Current Surveys Testing/Code Release”:

CURRENT SURVEYS
TESTING / CODE RELEASE

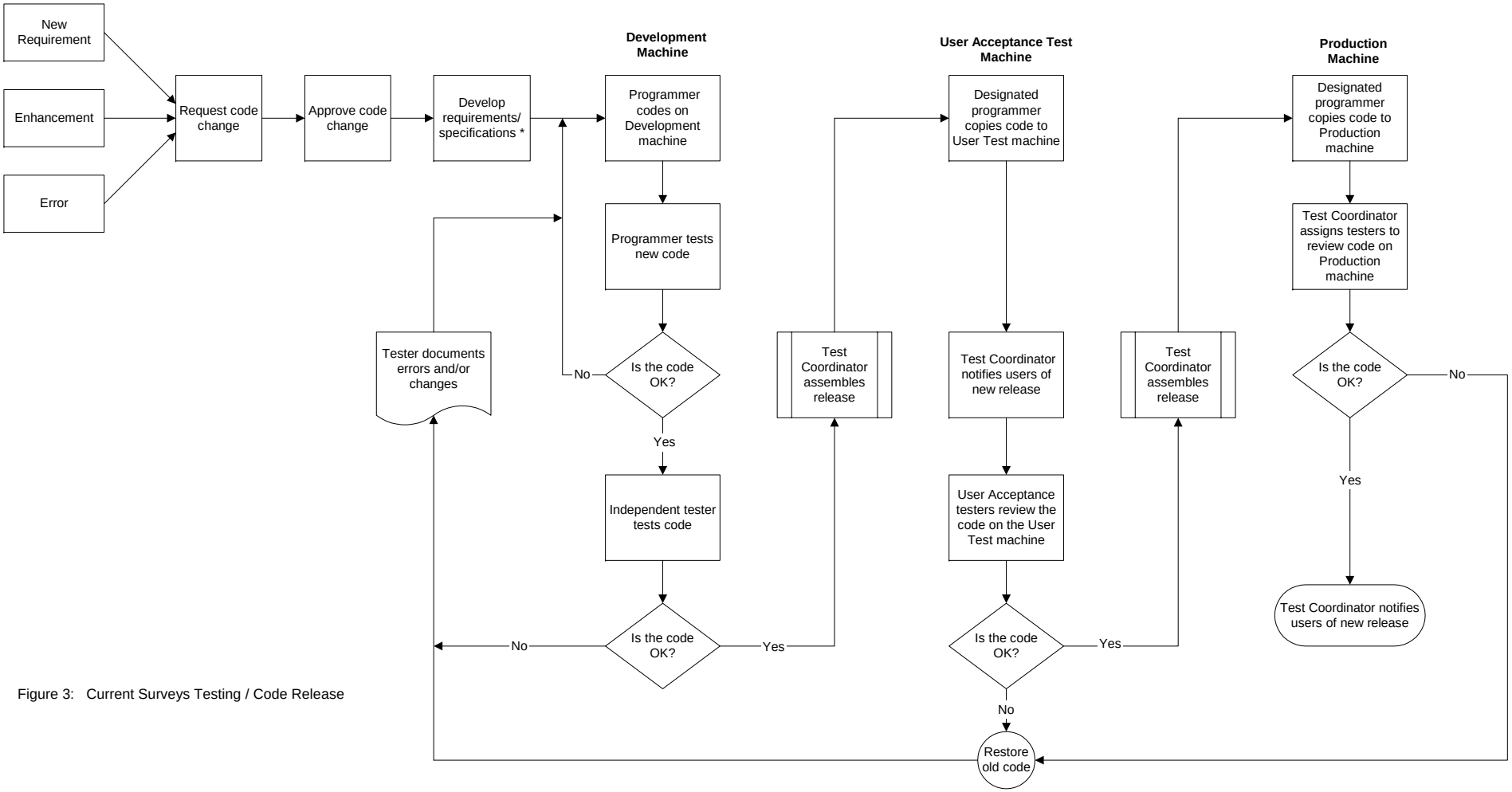

Figure 3: Current Surveys Testing / Code Release

* Although the flowchart emphasizes the testing/release phase of software development, it is important to note that updates to the user requirements or software specifications may be required as a result of coding and/or testing.

Software testing requirements include the following:

5.5.1 There must be a Test Coordinator. This may or may not be the same individual that serves as the CCC.

5.5.2 Three types of testing must be performed: Development test, user acceptance test, and production test.

5.5.2.1 Development Test

There are 2 parts to the Development Test: (1) developer test and (2) independent test.

Developer Test

The programmer who coded the change must test the code to verify that it performs per specifications. Once approved, he/she must notify the designated independent tester that the code is available for further testing.

Independent Test

An individual (or group), other than the programmer who coded the change, must also test the software. The independent tester could be the individual who wrote the specification for the code change, another programmer, or a person assigned to a staff solely responsible for testing system software changes. This individual (or group) must verify that the code performs per specifications.

5.5.2.2 User Acceptance Test

Once the independent tester has approved the code, he/she must notify the Test Coordinator. The Test Coordinator will then identify (with input from the subject matter and programming staffs) which users will be responsible for testing. At a minimum, the individual who requested the change will be responsible for testing it. (Note: For small projects, the team may elect to have one person fill the roles of both the independent tester and the user acceptance tester.)

User acceptance testing should be performed on a machine or in an area separate from the development test area used by the programmers and independent testers.

Once the change is approved by the users, they must notify the Test Coordinator.

5.5.2.3 Production Test

The Test Coordinator will request that the designated programmer copy the code to the production machine.

The Test Coordinator will assign staff to perform minimal testing to verify that the code is working properly on the production machine.

5.5.3 Errors detected during the various testing stages must be documented using a standard format. (See Attachment D, "Sample Testing Form".) At a minimum, the following information must be included:

- Change request number
- Program change number (if applicable) *Program change numbers are assigned to pieces of code for tracking purposes. <u>One</u> change request may result in revisions to 3 different pieces of code. Small systems may elect to use the "change request number" only for tracking.*
- Brief description of change
- Name of programmer that coded the change
- Name of tester
- Test start date
- Test completion date
- Detailed list of any errors detected
- Classification of change (i.e., error, new requirement, enhancement)

5.5.4 When the programmer receives the list of changes/errors from the tester, he/she must document which changes were made and which were not. If a change was not made, the reason must be stated (i.e., not feasible, not part of original requirements).[11]

5.5.5 The various stages of testing must be tracked. The following information should be recorded for each phase of testing:

- Change request number
- Program change number (if applicable) *Program change numbers are assigned to pieces of code for tracking purposes. <u>One</u> change request may result in revisions to 3 different pieces of code. Small systems may elect to use the "change request number" only for tracking.*
- Description of change
- Test start date
- Test deadline
- Test completion date
- Name of individuals assigned to test
- Initials of tester(s) who approves a change

5.5.6 Benchmarks must be run on all (or logical groups of) surveys to verify that the same output is generated whenever a major code change is implemented. ESMPD, with input from the subject matter areas, will create and maintain these benchmarks. Benchmarks should be run on the development machine (by ESMPD staff) after the code has been reviewed by an independent tester. Benchmarks may be run concurrently during user

[11] A tester may submit cosmetic or usability changes that do not necessarily reflect an error in the code. The requested change may be involved or not feasible, or the change may not reflect the original requirements. In such cases, the programmer is not required to make the change; however, he/she is responsible for communicating this to the tester.

acceptance testing.

5.6 SOFTWARE RELEASE

When the code change has been tested and approved by the users, the new code will be copied by a designated programmer to the production machine. At this time, all users must be notified of the change and all related documentation updated.

Requirements for the software release process include the following:

5.6.1 The Test Coordinator will assign the change to a "release". Changes may be grouped together and 'released' (copied to production) at one time.

5.6.2 A designated programmer will:

- Copy the version of code currently on production to a designated backup site. (A procedure for retrieving this code, should it be necessary, must be specified in Section V of the "SCM Details List".)

- Copy the newly developed code from the development area to production.

5.6.3 The Test Coordinator will notify the users that the code has been copied to production.

This notification will be in the form of a "Release Summary", and will include the following information:

- Release number
- Release date
- Change request number
- Type of change
- Description of the change
- The module or components of the system affected by the change

5.6.4 The CCC will:

- Consult with appropriate persons to verify that all documentation related to the change has been updated (e.g., specifications, user manual, systems manual, on-line help).

- Consult with appropriate persons to ensure that training (for the newly released code) is provided, when necessary.

- Close the ticket to record that the change request has been completed.

5.7 CHANGES MANDATED BY UPPER MANAGEMENT

In rare instances, changes to the system may be mandated by upper management (e.g., Current Surveys Planning Group, Assistant Director of Economic Programs). In such cases, the approval process will vary slightly. The request should still go through the Change Control process because it still represents a change to the system. It must also be tracked and the implementation and action items assigned. The CCB will not be required to approve or deny the change, however, since management has already approved the request. The following procedure should be followed whenever a change is directed by management:

5.7.1 Management will inform the CCB of the change.

5.7.2 The CCB or CCC will fill out a Change Request form for the change.

5.7.3 The CCC will document in the "Comments" section of the Change Control form the history/background of the decision/directive and reference any supporting documents or charters.

5.7.4 If the CCB is concerned about the impact of the change, they may perform an impact analysis and present their findings to upper management. Although such an analysis would not likely change the management decision, it may impact the priority for implementing it.

5.7.5 The change will be tracked like any other.

5.8 EMERGENCY FIXES

A change request presumed to be an "error" and assigned an *emergency/critical priority* because the error is affecting production or mail-out schedules, must be addressed immediately. The processing of such requests will deviate from the normal Change Control process in order to expedite its resolution. All current survey projects must define a process for handling emergency fixes and include this process in Section IV of the "SCM Details List" (Appendix A). For StEPS-related projects, see the "StEPS Change Control Process" (Hummingbird #1655).

6. COMMUNICATION STRATEGY

A communication strategy is needed to identify who will be notified when a change request is submitted, approved, and implemented. In addition, the method of communication (e.g., e-mail, formal memo, meeting, weekly status list) should be specified to ensure that all affected/interested persons are made aware of changes to work products or updates in status.

Each software project must include guidelines or procedures that describe how changes to configuration items will be communicated and to whom. For legacy systems and software developed outside of StEPS, identify the communication strategy for your project in the "SCM Details List" (Appendix A). Be sure to also include the name(s) of the communicator(s) in Section III, "Roles and Responsibilities". For StEPS-related projects, refer to the "StEPS Change Control Process"

document (Hummingbird #1655).

7. IMPLEMENTING AND TRACKING APPROVED CHANGES

Each project must define a process for implementing and tracking approved changes (to configuration items). Such processes may include information on how the change will be implemented, who will coordinate the implementation, who will be assigned the work, and how the status of the change will be communicated at various stages in the software development life cycle. Tracking systems may be manual or automatic. For legacy systems and software developed outside of StEPS, identify the reports and/or tools used to track the status of an approved change in the "SCM Details List" (Appendix A). For StEPS-related projects, refer to the "StEPS Change Control Process" document (Hummingbird #1655).

8. UPDATING AND MAINTAINING THE "SCM DETAILS LIST"

The "SCM Details List" (Appendix A) for each project should be reviewed periodically to ensure that the persons identified as having roles/responsibilities in the process are current, that the procedures are being followed, and that any improvements (to the process) are made. At a minimum, these lists should be reviewed annually to ensure that they are current and up-to-date.

<Instructions: Complete this form (Hummingbird document #1117) and include as an attachment to the Software Development Plan for your project; be sure to delete all italicized instructions prior to saving.>

Current Surveys SCM Details List

PROJECT:
DATE:

I. Configuration Items

1. Production Code
2. Computing Environment
3. Requirements Documents
4. Design Documents
5. Software Development Plan
6. Current Survey Milestones Schedule
7. Others *<list other configuration items for your project, if applicable>*

II. Library of Baselined Products

1. Production Code

   <Where does the code reside; is a code management system in use?>

2. Computing Environment

   <Where are details of hardware and software located?>

3. Requirements Documents

   <Hummingbird guideline profile for storage; are versions used for changes?>

4. Design Documents

   <Hummingbird guideline profile for storage; are versions used for changes?>

5. Software Development Plan

   <Hummingbird guideline profile for storage; are versions used for changes?>

6. Others

<For each 'other' listed configuration item, where is the library of baselines?>

III. Roles and Responsibilities

	ROLES and RESPONSIBILITIES	DETAILS
1	Requesters	*<List the names (or groups) of those allowed to request a change>*
2	Change Control Coordinator (CCC)	*<List the name of the person that will serve as the CCC>*
3	Change Control Board (CCB)	*<List the names of those that will serve on the CCB>*
4	2nd Level Change Control Board (CCB2)	*<List the names (or group) of those that will serve on the CCB2>*
5	Others	*<List other groups or individuals that may be involved in the change control process and detail their roles>*

IV. Change Control Flow:

Adheres to the Change Control flow outlined in the "SCM Plan for the Economic Current Surveys".

<If the Change Control flow varies from the SCM Plan for Economic Current Surveys, document the differences.>

V. Communication Strategy:

	COMMUNICATION	DETAILS
1	Change Request	*<List the names of those notified of a change request>*
2	Approval Status	*<List the names of those notified of the approval status of a change request>*
3	Implementation Status	*<List the names of those notified of the implementation status of a change request>*
4	Other Communication Methods	*<List any other communication method related to change control (e.g., post approved changes on web)>*

VI. Implementation and Tracking Flow:

<Detail the specific implementation and tracking flow (of a change) for your project>

Current Surveys **CHANGE REQUEST FORM**	Change Request #: ____ Status: ☐ Open ☐ Closed

REQUESTOR INFORMATION

Name:	**Date submitted:**	**Date change needed:**
Phone:	**Division/Branch:**	**Bldg/room #:**

CHANGE INFORMATION

Short title of change request:				
Project name:			**Charter Document # (if applicable):**	
Type of change:	☐ Documentation	☐ Processing System	☐ Both	
Reason for change:	☐ Error	☐ New requirement	☐ Enhancement	
Priority:	☐ Emergency/critical	☐ High	☐ Medium	☐ Low
Scope (complete applicable sections):				
Module(s) affected:				
Survey(s) affected:				
Working draft/Final documents affected:				
Software Work Products affected:				
Change description (include justification):				

INITIAL REVIEW

Date reviewed:	**CCB Decision:** ☐ Approve ☐ Deny ☐ Defer ☐ Refer to 2nd CCB
Comments: <include information gathered from discussions with the User's Group, StEPS Development staff, DARB, etc.>	

DETAILED ANALYSIS

Date reviewed:	**2nd CCB Decision:** (if necessary) ☐ Approve ☐ Deny
Comments: <include resources needed, risk assessment, proposed changes to master schedule, estimated completion date, etc.>	

RESOLUTION

Date resolved:
Resolution:

Assignments:			
Task	**Responsibility**	**Planned Completion Date**	**Actual Completion Date**

SAMPLE CHANGE REQUEST ASSESSMENT FORM

StEPS CHANGE ASSESSMENT

Change Control #: _____ Name of Board Member: _____
Date: _____

1. **Description of change:**
2. **Expected benefits:**
3. **Resources needed:**
   - Create/update requirements
   - Create/update specifications
   - Design and code
   - Test
   - Update user documentation
   - Training
4. **Supports Economic Directorate goal(s)?** ___ Yes ___ No
5. **Surveys affected by the change:**
6. **Components of the system affected by the change (e.g., performance, other modules):**
7. **Length of time to implement:**
8. **Alternatives:**
9. **Comments:**

SAMPLE TEST RESULTS FORM

Change request # (if applicable): _____
Description of change: _____
_____
_____

Programmer: _____
Tester: _____
Test start date: _____
Test completion date: _____

NO.	TESTER		PROGRAMMER	
	Program Change #	Description of Error/Change	Completed ✓	Comments
1				
2				
3				
4				
5				
6				
7				
8				

Appendix E

<Current Date>

SAMPLE RELEASE NOTIFICATION

Release name: _____
Release date: _____

CHANGES INCLUDED IN THE RELEASE			
Change Control #	**Module**	**Type of Change***	**Change Summary**

* Type of Change: N - New requirement
E - Enhancement
F - Error

GLOSSARY OF SCM TERMS

Terms associated with software configuration management and used throughout this document are defined below. Definitions were taken from the Census Software Process (CSP) glossary, July 2004, which was created by the Census Software Engineering Process Group (SEPG).

	TERM	DEFINITION
1	Baseline	A specification or product that has been formally reviewed and agreed upon, and, thereafter serves as the basis for further development, and that can be changed only through formal change control procedures
2	Change Control Board	A group responsible for evaluating and approving or disapproving proposed changes to configuration items and for ensuring implementation of approved changes
3	Change Control Manager	A person responsible for defining and overseeing the change control process. This role typically reviews and tracks change requests, and defines criteria for evaluating all request changes to the software product
4	Change Control Process	An element of configuration management, consisting of the evaluation, coordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration identification
5	Change Request Form	A tool in configuration management used to formally submit change requests of a configuration item
6	Configuration Item	A work product (e.g., documentation, software, hardware, etc.) that has been designated for configuration management
7	Configuration Management	A discipline applying technical and administrative direction and surveillance to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, record and report change processing and implementation status, and verify compliance with specified requirements
9	Integrator	A role responsible for planning and performing the integration of software components
10	Release	The formal distribution and notification of an approved version
11	Software Development Plan	The collection of plans that describe the activities to be performed for the software project. It governs the management of the activities performed by the software group for a software project

	TERM	DEFINITION
12	Work Product	The complete set, or any of the individual items of the set, of computer programs, procedures, and associated documentation and data produced as a result of a software project